Amendments to the Specification:

Please amend the Description of the Prior Art as filed as follows:

The two paragraphs that start at line 34 on page 2 and end at line 14 on page 3:

Some papermaking processes incorporate multiple headboxes with each headbox contributing to a single layer or ply of the final paper sheet. In such a multi-ply configuration, the top and bottom fiber orientation measurements are influenced by completely different headboxes. In single headbox paper machines, the top and bottom fiber orientation measurements are influenced by the same headbox.

Adjusting headbox jet-to-wire speed difference ($V_{jw}=V_j-V_w$) can change the FO distribution in a paper sheet. Figure 8 shows how the FO measurements of one side of a sheet are affected by changing the jet-to-wire speed difference of one headbox. In Figures 8(a) and 8(b), both FO angle and ratio profiles are plotted as the contour map for a time period of approximately 100 minutes. The corresponding trend of jet-to-wire speed difference is also shown in Figure 8(c).

Please amend the Description of the Preferred Embodiment(s) as filed as follows:

The paragraph that begins at line 34 on page 8 and ends at line 11 on page 9 as follows:

In a general form, each FO profile can be transformed into a scalar index by the following transformation:

$$y = \frac{\int_{z_1}^{z_2} p(z)h(z)dz}{\int_{z_1}^{z_2} h^2(z)dz} \tag{1}$$

where z is a CD location relative to a CD coordinate and z_1 and z_2 are sheet edge locations along the same CD coordinate. $p(z)$ is the measurement of a FO profile at CD location z and $h(z)$ is

a reference function. The reference function $h(z)$ can be a unit step function, an asymmetric unit step function, a sinusoidal function, a polynomial function, or their combinations defined between two sheet edge locations z_1 and z_2. Figure 9, described below, shows several examples of these functions.

The paragraph that starts at the last line of page 10 and ends at line 12 on page 11 as follows:

If the reference function is a quadratic function between two sheet edge locations z_1 and z_2, as shown by 118 in Fig. 9(d), the derived concavity index r_c of $\mathbf{r_p}$ accentuates the concavity of the measured profile. Expressing in a discrete form, the concavity index r_c is computed as a function of an inner product of $\mathbf{r_p}$ and a vector $\mathbf{h_3}$:

$$r_c = \frac{\mathbf{r_p h_3^T}}{\mathbf{h_3^T h_3}} \tag{4}$$

where $\mathbf{h_3}$ is a quadratic function as shown by 118 of Fig. 9. Other general cases can easily be derived from the similar concept.

The paragraph that begins at line 15 on page 11 and ends at line 18 on that page as follows:

This index is more relevant to the fiber ratio profile measurement since the inherent nature of paper fiber orientation is as the result of flow pattern exiting from a headbox.

The two paragraphs that start at line 20 on page 12 and end at line 4 on page 13 as follows:

To generalize the indices derived from the FO ratio profiles, a common expression r_{zL} where the subscript z is either m, c, t, or s_L can be used to represent the indices

described in the equations (2) to (5). Similarly, for the measured fiber angle profile a_p, the corresponding generalized indices can be represented as a_z where z is either $m, c, t,$ or s. r_z and a_z represent the generalized indices outputs from block 14 of Fig. 1 as the results of the index transformation of the measured fiber ratio and fiber angle profiles r_p and a_p. In general cases, equation (1) can be applied to make any combination of the above indices or other meaningful indices.

As an example, the FO <u>angle and ratio</u> profiles 102 and 104, <u>respectively,</u> as indicated in Figs. 8(a) and 8(b), respectively, are transformed with signature reference functions 120 and 122 of Figs. 9(e) and 9(f) into their corresponding signature indices 132 and 134 of Figs. 10(a) and (b), respectively. The same transformation can be applied for both top and bottom FO profiles.

The paragraph that starts at line 3 on page 14 and ends at line 13 on that page as follows:

<u>As is shown in Fig. 1,</u> BFOC 12 receives the <u>target</u> inputs r_{tgt} and a_{tgt}; the inputs r_z and a_z from the output of FO indices transform 14; the inputs Δr_z and Δa_z also from the output of FO indices transform 14; and from differentiator 16 the input Δx. BFOC 12 uses the inputs r_{tgt} and r_z to determine e_r and the inputs a_{tgt} and a_z to determine e_a. The output Δu of BFOC 12 is connected as one of the two inputs to summer 18 which has its other input connected to the control setpoint u either from operator entry or other controllers.